WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

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Temperature was above the January average, except over the Plateau and Pacific coast States. The most marked departures above the normal were noted in the upper Missouri and Red River of the North valleys and northeastern New England where they exceeded 6°. Over Nevada the temperature deficiency was 6° to 9°. In California the month was cold with severe frosts. Precipitation was in excess of the January normal in western Washington, parts of the southern Plateau, and southern Rocky Mountain districts and in a belt that extended irregularly eastward from Wyoming and in the middle and lower Missouri Nalley over the Middle Atlantic and New England States. The greatest deficiency in rainfall occurred in southwestern Oregon, the lower Sacramento Valley, and in the Southern States east of the Rocky Mountains, where the amount for the month was about 2 inches less than the normal. Snowfall was unusually heavy in the Ohio Valley, Lake region, and portions of the Middle Atlantic States. In southern California, southern Nevada, and northern Arizona heavy rains caused destructive floods. Flood damage due largely to ice gorges occurred at points along the Ohio and Susquehanna rivers.

The cold wave that covered Florida at the close of December carried the line of freezing temperature below Miami on the east coast and below Tampa on the west coast. In the interior a minimum of 22° was registered by the Weather Bureau instruments at Arcadia, DeSoto County. Considerable damage was caused to fruit in localities where growers failed to make provision to protect their crops. In the northern portion of the State unprotected fruit was frozen.

The Jacksonville Evening Metropolis, of January 1, 1910, remarks as follows regarding the warnings:

> The warnings of the Weather Bureau regarding the impending cold wave were heeded in many sections of the State and a great many planters protected their young plants and fruit trees.

In southern California the month opened with torrential rains that combined with melted snow from the mountains flooded rivers, crippled traffic, and resulted in great losses of railroad property about Los Angeles.

A disturbance that occupied the extreme western portion of the United States at the close of December moved slowly eastward during the first week of January, preceded over middle and northern districts east of the Rocky Mountains by a cold wave and followed west of the Rockies by exceptionally low temperature and snow. At San Francisco, Cal., the lowest temperature reached since 1888 was recorded. The night of the 4th an offshoot from this disturbance passed from the middle-western States over Lake Superior and caused a sharp rise in temperature from the Mississippi eastward. The main disturbance, however, moved from the Rocky Mountains southeastward to the Gulf of Mexico and thence northeastward, during the 5th, 6th, and 7th, over the Atlantic seaboard, attended by heavy rains in Southern, rain, sleet, and snow in Middle and Southwestern States, heavy snow in middle and northern districts from the Plateau to the Atlantic, and by gales along the Gulf and Atlantic coasts. Following the disturbance a cold wave carried the line of freezing temperature to the west Gulf coast the night of the 5th, and to the east Gulf coast the night of the 6th. On the 4th advices were telegraphed that heavy snow would set in on that date over the middle and north-central valleys and the Lake region and begin in the Middle Atlantic and New England States on the 5th. The snowfall in the north-central and northeastern sections was heavy. In the Ohio Valley and lower Lake region and thence eastward rain and sleet changed to heavy snow and in the Middle Atlantic States sleet was followed by heavy rain. Timely warning was given of the cold wave that preceded and followed the storm and the gales that attended its advance along the coasts.

The development of a disturbance that had its origin in the disturbed conditions off the southeast coasts that followed this storm retarded the advance across the continent of a storm announced on the 6th to cross the country from the 7th to 11th. The storm referred to appeared on the Pacific coast on the 7th, but did not assume marked form over the interior until the 11th, when it was located over the southern Rocky Mountain district. By the morning of the 12th the center of the disturbance had advanced to the Texas Panhandle and during the next 24 hours moved to the middle Mississippi Valley with a decided increase in strength and general precipitation in the Ohio, Mississippi, and Missouri valleys and the Southwest. In the more northern districts the precipitation was in the form of snow and in parts of the Missouri and upper Mississippi valleys and in the southwestern Lake region the snowfall was heavy. Warnings of heavy snow were issued the morning of the 12th for southern Wisconsin and Lower Michigan. The morning of the 13th heavy snow warnings were issued for the lower Lake region, northern Ohio, and the interior of New York and Pennsylvania. At that time the center of the storm occupied Ohio and the area of precipitation extended during the day to the middle Atlantic coast. The morning of the 14th warnings of heavy snow were telegraphed throughout New York and New England. Moving eastward off the middle Atlantic coast during the 14th the storm was central the morning of the 15th off the southeast New England coast and the snowfall that had attended it was sufficiently heavy to seriously interfere with traffic in parts of New York and New England. Warnings of the gales that occurred along the middle Atlantic and New England coasts during the 14th were sent out on the 13th.

On the 12th an area of high barometer that had apparently moved eastward from the northern Siberia region and the Arctic Ocean covered the American Continent from the Hudson Bay district over the interior of Alaska and a temperature of −60° was reported at Eagle, Alaska. By the morning of the 14th the British American high area had extended over the Canadian Maritime Provinces and the position of the high area with reference to the disturbance that passed eastward from the Ohio Valley defined the course of the storm and contributed to produce the heavy snows that occurred in its northern quadrants.

A disturbance that appeared on the north Pacific coast on the 13th and moved thence over the British Northwest caused general rains in the extreme west and a flow of warmer southerly winds over the Rocky Mountains and Plains States. On the morning of the 15th another storm area covered the north Pacific States, with rain along the coast north of Los Angeles.

On Sunday, the 16th, the following special forecast was issued:

> During the next few days and probably for the entire week temperature will be moderate for the season generally throughout the United States, and sharp falls in temperature will be confined mostly to the more northern States from the Lake region eastward. Precipitation that may occur in the Plains States and central valleys during the next few days and later in the middle-eastern and northeastern States will be in the form of rain, except in northern tier of States where it will fall as snow. In the southeastern States the weather of the week promises to be fair, with temperature above the average for the season.

From the 17th to 19th a storm of considerable strength advanced from the Rockies to the St. Lawrence Valley attended by general precipitation from the Plains States to the Atlantic. In extreme northern districts the precipitation was partly in the form of snow. The advance of the storm was

preceded by a marked rise in temperature and high winds, for which warnings were issued along the Atlantic coast, and it was followed by moderate falls in temperature to about the average for the season. By the 19th a general change to warmer weather had occurred over the Plains States and Mississippi Valley. During the succeeding 24 hours there was a marked fall in pressure over the Hawaiian Islands and the Azores and a decided rise over Alaska and Iceland. On the 20th a marked rise in pressure was noted over Bering Sea, Alaska, and Iceland and a decided fall occurred over the Hawaiian Islands and the Azores.

During the 24 hours ending the morning of the 20th a disturbance moved rapidly southeastward from the British Northwest to the upper Lakes and another from Colorado to Texas. The evening of the 20th storm warnings were ordered for the middle and east Gulf coasts and along the Atlantic coast from Jacksonville to Eastport. By the morning of the 21st the southern disturbance had developed marked intensity and moved northeastward to Virginia. Temperature had risen decidedly in the Atlantic States and fallen in the Plains States, Mississippi Valley, and the upper Lake region. Precipitation was general from the Mississippi Valley eastward, and in the middle and north-central valleys was in the form of snow. By the morning of the 22d the storm center had moved northeastward to the lower Lakes, with pressure 28.86 inches at Buffalo. High winds and precipitation had been general east of the Mississippi. Temperature had fallen in the East and South, with frost in northern Florida, and had risen decidedly over interior districts west of the Mississippi. Passing from the lower Lakes east of north over Ontario the disturbance moved thence northeastward north of the St. Lawrence Valley. The course of storms of this type is almost invariably northeastward to and off the Atlantic coast. In this instance persistent high pressure over the western Atlantic and the Canadian Maritime Provinces and a rapid southeast advance of a low area from Manitoba apparently contributed to cause the abnormal course of the storm. The pressure distribution referred to was also responsible for the prevailing moderate temperature of the week and for precipitation mostly in the form of rain instead of snow over eastern portions of the United States.

On Sunday, the 23d, the following special forecast was issued:

Cold weather is not indicated for the eastern half of the United States during the next 3 days. A disturbance that is now approaching the Pacific coast will advance to the Rockies by Tuesday morning, cross the Plains States and central valleys Tuesday and Wednesday and advance to the Atlantic seaboard by about Thursday, preceded by rising temperature, attended by rain in southern and snow or rain in northern States, and followed by cold weather that will reach the Plains States and central valleys about the middle of the week and the Atlantic States by Friday.

This disturbance was attended by rain and high winds on the Pacific coast Monday and by snow in Utah, Nevada, and Idaho. Tuesday morning it covered the Rockies, and Wednesday morning its center had reached the upper Mississippi Valley with reported minimum pressure 29.14 inches at Charles City, Iowa, and La Crosse, Wis. High winds and showers had occurred in the middle-west and snow flurries from the middle and northern Plateau over the Missouri and upper Mississippi valleys and the western Lake region In the Ohio and Mississippi valleys and the upper Lake region a marked rise in temperature had occurred and cooler weather was reported from the Rocky Mountain districts. By the morning of the 27th the center of disturbance had advanced to Lake Ontario, attended by rains from the Ohio Valley over the Middle Atlantic States and by snow from the Great Lakes over northern portions of New York and New England. During the next 24 hours the storm center moved to the Gulf of St. Lawrence. In the Atlantic States temperatures had risen and in the middle-western States there had been a sharp fall to about the average for the season. On this date a depression of slight depth occupied Texas and moved thence eastward over the Gulf States by the morning of the 28th with increasing intensity. Storm warnings were ordered on the middle and east Gulf and Atlantic coasts and warnings of probable heavy snow were telegraphed to Atlantic coast States from Maryland to Maine. By the morning of the 29th the storm center had advanced to the New Jersey coast, with reported minimum pressure 29.12 inches at Atlantic City. General rains or snows had fallen in the Atlantic and east Gulf States, the upper Ohio Valley, and the lower Lake region, and in the Southern States rain had been followed by clearing, colder weather. On the middle and east Gulf and Atlantic coasts the winds attending the storm were high. During the next 24 hours the disturbance moved northeastward over the Canadian Maritime Provinces.

From the middle to the closing days of the month exceptionally heavy rains and resultant destructive floods were experienced in western Europe. During thus period barometric pressure was abnormally low over Iceland and adjacent European districts and west-central and northwestern portions of Europe were almost constantly covered by the rain quadrants of a rapid succession of cyclonic areas of exceptional magnitude and intensity. Similar conditions existed over Bering Sea and adjacent portions of the Pacific Ocean and the North American Continent where gales and heavy precipitation also prevailed. During the continuance of these great cyclonic areas in the high latitudes of the oceans barometric pressure was unusually high over Siberia, the Azores, and the tropical and subtropical regions of the Pacific. On January 30 the following special forecast was issued:

Present barometric conditions over the Northern Hemisphere indicate that during the week beginning Monday, January 31, temperature will be moderate for the season generally over the United States until about the close of the week, when a cold wave is likely to appear in the extreme northwest and advance thence to the Atlantic coast by the early portion of next week. In the mean time storms that will reach the Atlantic seaboard about the middle and close of the week will be attended by sharp fluctuations in temperature in middle-eastern and northeastern States, and by precipitation generally east of the Mississippi. In middle and northern districts the precipitation will be in the form of snow. In the Missouri and western Mississippi valleys and the Plains States precipitation will be comparatively light.

During the week preceding January 30 exceptionally low temperature prevailed in the Canadian extreme Northwest and Alaska, with reported minimum −60° at Tanana, on the Yukon. Temperatures were also unusually low in California, the Gulf States, and Florida, where frost occurred on several dates. A storm that advanced from the Rockies to the Atlantic coast from Tuesday to Thursday, February 1 to 3, was attended by general precipitation east of the Mississippi and by heavy snow in northern portions of New York and New England. The

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	28.5	+ 4.0		
Middle Atlantic	15	32.6	+ 1.3		
South Atlantic	11	45.7	+ 0.6		
Florida Peninsula*	8	58.4	− 1.0		
East Gulf	11	48.7	+ 1.3		
West Gulf	10	49.6	+ 3.5		
Ohio Valley and Tennessee	13	34.2	+ 0.6		
Lower Lakes	10	25.4	+ 1.3		
Upper Lakes	12	20.0	+ 2.1		
North Dakota*	9	8.6	+ 3.5		
Upper Mississippi Valley	14	22.7	+ 1.2		
Missouri Valley	12	23.6	+ 2.5		
Northern slope	9	20.8	+ 1.8		
Middle slope	6	32.1	+ 3.1		
Southern slope*	8	43.0	+ 2.8		
Southern Plateau*	11	40.0	+ 1.1		
Middle Plateau*	10	21.1	− 3.6		
Northern Plateau*	10	25.7	− 2.3		
North Pacific	7	38.5	− 1.0		
Middle Pacific	5	44.2	− 3.0		
South Pacific	4	49.8	− 1.0		

*Regular Weather Bureau and selected cooperative stations.

week closed with a cold wave over the Missouri and middle and upper Mississippi valleys that advanced thence eastward over the Atlantic States during Sunday and Monday, attended in portions of the Middle Atlantic States by the lowest temperature of the winter. At Washington, D. C., a minimum of 8° was reached Monday morning, February 6, the lowest previous reading for the season being 8.1° on December 30, 1909. A notable feature of this cold wave was the extremely low temperatures noted in the kite flights at Mount Weather, where at an elevation above the station of 6,700 feet a reading of −26° on the morning of February 7 was recorded. At the station the the temperature at the same hour was 14°.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	11	4.65	135	+ 1.2	
Middle Atlantic	15	4.16	120	+ 0.7	
South Atlantic	11	2.34	61	− 1.5	
Florida Peninsula*	8	1.06	37	− 1.8	
East Gulf	11	3.16	64	− 1.8	
West Gulf	10	1.38	46	− 1.6	
Ohio Valley and Tennessee	13	4.11	195	+ 2.0	
Lower Lakes	10	3.68	127	+ 1.0	
Upper Lakes	12	1.84	90	− 0.2	
North Dakota*	9	0.50	50	− 0.3	
Upper Mississippi Valley	15	1.90	112	+ 0.2	
Missouri Valley	12	1.41	140	+ 0.4	
Northern slope	9	0.94	112	+ 0.1	
Middle slope	6	0.43	68	− 0.2	
Southern slope*	8	0.26	27	− 0.7	
Southern Plateau*	11	6.76	79	− 0.2	
Middle Plateau*	11	0.90	82	− 0.2	
Northern Plateau*	10	1.37	76	− 0.4	
North Pacific	7	7.33	111	+ 0.7	
Middle Pacific	7	3.27	73	− 1.2	
South Pacific	4	2.06	75	− 0.7	

*Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	78	+ 2	Missouri Valley	81	+ 6
Middle Atlantic	76	0	Northern slope	76	+ 6
South Atlantic	74	− 3	Middle slope	70	+ 3
Florida Peninsula	79	− 2	Southern slope	61	− 5
East Gulf	72	− 6	Southern Plateau	60	+10
West Gulf	69	− 7	Middle Plateau	78	+ 8
Ohio Valley and Tennessee	78	+ 1	Northern Plateau	77	− 3
Lower Lakes	82	+ 1	North Pacific	84	+ 1
Upper Lakes	84	+ 1	Middle Pacific	82	+ 1
North Dakota	90	+10	South Pacific	69	− 6
Upper Mississippi Valley	81	+ 3			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	6.6	+ 0.7	Missouri Valley	5.5	+ 0.5
Middle Atlantic	6.8	+ 1.0	Northern slope	5.4	+ 0.3
South Atlantic	5.2	− 0.1	Middle slope	4.6	+ 0.5
Florida Peninsula	4.6	− 0.2	Southern slope	4.8	+ 0.4
East Gulf	4.8	− 0.9	Southern Plateau	3.4	0.0
West Gulf	4.4	− 0.9	Middle Plateau	5.4	+ 0.3
Ohio Valley and Tennessee	7.1	+ 0.7	Northern Plateau	7.7	+ 1.0
Lower Lakes	8.4	+ 1.0	North Pacific	7.8	+ 0.3
Upper Lakes	7.5	+ 0.6	Middle Pacific	6.6	+ 1.0
North Dakota	5.8	+ 0.9	South Pacific	5.1	+ 0.6
Upper Mississippi Valley	6.2	+ 0.8			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Alpena, Mich	5	56	sc.	New York, N. Y	29	56	w
Block Island, R. I	4	62	nw.	North Head, Wash	17	78	s.
Do	14	73	ne.	Do	18	60	s.
Buffalo, N. Y	18	56	sw.	Do	23	50	se.
Do	22	56	sw.	Do	24	64	se.
Do	23	56	sw.	Do	25	61	se.
Burlington, Vt	1	50	s.	Do	27	58	se.
Do	5	54	s.	Do	29	60	se.
Do	22	52	s.	Do	30	61	s.
Canton, N. Y	3	50	w.	Do	31	70	nw.
Do	19	50	sw.	Oklahoma, Okla	20	50	n.
Do	22	52	sc.	Point Reyes Light, Cal.	1	54	nw.
Cheyenne, Wyo	18	54	w.	Do	13	72	s.
Do	25	50	nw.	Do	14	69	s.
Do	26	60	w.	Do	15	68	s.
Cleveland, Ohio	5	54	se.	Do	23	65	s.
Duluth, Minn	20	52	nw.	Do	24	58	s.
Eastport, Me	22	56	se.	Do	31	83	nw.
Hatteras, N. C	24	58	s.	Providence, R. I	22	52	se.
Indianapolis, Ind	26	50	w.	St. Louis, Mo	26	50	w.
Jacksonville, Fla	28	54	sw.	Sioux City, Iowa	20	55	nw.
Memphis, Tenn	18	54	sw.	Southeast Farallon, Cal.	13	58	s.
Do	20	50	nw.	Do	14	50	s.
Milwaukee, Wis	4	55	sc.	Do	15	50	s.
Modena, Utah	1	58	sw.	Do	31	60	n.
Mount Tamalpais, Cal	13	54	sw.	Syracuse, N. Y	5	58	s.
Do	23	57	sw.	Do	22	54	se.
Do	31	70	nw.	Tatoosh Island, Wash	1	57	ne.
Mount Weather, Va	7	62	nw.	Do	15	54	ne.
Do	29	58	nw.	Do	17	66	s.
Nantucket, Mass	14	66	ne.	Do	18	53	sw.
Do	15	60	ne.	Do	25	50	sw.
Do	29	64	sw.	Do	26	62	sw.
New York, N. Y	4	50	nw.	Do	29	64	s.

RAINFALL IN JAMAICA.

The northern division comprises the northern shores from Port Maria to Davis Cove, including the central part of the Island which forms the central subdivision; the southern division comprises the southern shores from Holland Bay to South Negril; the northeastern and west-central divisions are the remaining parts of the Island bounded by the sea and the other divisions.

Through the kindness of Mr. Maxwell Hall, meteorologist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following data:

Comparative table of rainfall.

[Based upon the average stations only.]

JANUARY, 1910.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1909.	Average.
			Inches.	*Inches.*
Northeastern division	25	17	11.64	7.23
Northern division	22	41	4.75	3.75
West-central division	26	20	2.18	2.98
Southern division	27	26	2.58	1.84
Means	100		5.29	3.95

The heaviest rainfall, 37.57, was recorded at Mount Holstein, and the smallest, 0.08, at Whitehall.

There was a remarkably heavy rainfall in the western half of the Parish of Portland; besides Mount Holstein, Greenvale and Shrewsbury had very heavy rainfalls.